Observations on the Effects of Magnesia, in preventing an increased Formation of Uric Acid; with some Remarks on the Composition of the Urine. Communicated by Mr. William T. Brande, *F.R.S. to the Society for the Improvement of Animal Chemistry, and by them to the Royal Society.* Read February 22, 1810. [*Phil. Trans.* 1810, *p.* 136.]

Mr. Home's inquiries into the functions of the stomach, and his discovery of liquids passing directly from the cardiac portion into the circulation of the blood, occasioned him to consider the prevention of calculous complaints, by correcting the generation of acid in the stomach, and consequent secretion of uric acid.

Since magnesia was better adapted to the mere correction of acidity than alkalies, as it could not be absorbed till it had been previously dissolved, Mr. Home was desirous of examining its effects in preventing the generation of uric acid, and requested Mr. Brande's assistance for that purpose.

After several previous trials, in which it appeared that an excessive secretion of uric acid was corrected by magnesia more than by a liberal use of alkalies, it was afterwards tried in various cases of confirmed calculus; and four cases are selected as instances of the principal varieties of that disorder, from many others in which magnesia was tried.

The first was that of a gentleman of 60, who had passed small calculi of uric acid.

He had first taken subcarbonate of soda in water highly impregnated with carbonic acid, to the quantity of nine drachms in a day, but without any apparent effect on the secretion and formation of uric concretions.

He then took, in the same manner, subcarbonate of potash, dissolved in water impregnated with carbonic acid, to the quantity of three drachms every day; but though the deposit of sand from the urine was in some degree diminished, yet small calculi continued occasionally to be voided.

On the contrary, by taking as much as fifteen grains of magnesia three times a day, the quantity of uric acid was diminished in quantity; and after three weeks was only occasionally perceived in his urine.

The second case is that of a gentleman 40 years of age, who for four years preceding had occasionally passed much red sand, and once a small calculus.

Subcarbonate of soda was first given him in water highly impregnated with carbonic acid, which had the effect of diminishing the secretion of uric acid, but not of preventing occasional severe attacks after irregularities in his diet.

Magnesia was next directed, to the quantity of twenty grains every night and morning; and during six weeks' continuance of this preventive, he had no return of his complaint, and no superabundance of uric acid in the urine.

The third was a gentleman of 43, who had passed three small calculi, and whose urine had for a short time been constantly turbid, and occasionally deposited red sand.

By the use of soda-water, these symptoms were diminished, but returned in some degree even during the continued use of it; and his urine became also loaded with mucus.

By taking twenty grains of magnesia every night, the uric acid diminished in quantity, but did not disappear entirely, even by the continued use of magnesia for three weeks in the same quantity. It was then repeated every night and morning for a month, and succeeded in restoring the urine to a perfectly healthy state. Upon a return of the disorder, he had recourse again to the magnesia, with the same effect.

The fourth patient was subject to gout, and occasionally voided abundance of red sand, consisting of uric acid. He was subject to heart-burn, and to other pains attendant upon weakness of stomach, for which he had been in the habit of taking tincture of bark and other spirituous medicines. He had also tried the use of alkalies, but could not continue them on account of the unpleasant sensation they occasioned in his stomach.

Magnesia was accordingly given, at first three times a day, and afterwards in a quantity of twenty grains twice every day; and it had the effect of lessening the disposition to form uric acid, and appeared also at least to suspend the attacks of gout for a greater length of time than he had been accustomed to.

Comparative trials were afterwards made of the effects of the alkalies and of magnesia upon healthy urine.

Two drachms of subcarbonate of soda seemed to Mr. Brande to produce its full effect upon the urine in a quarter of an hour after it had been taken, occasioning a precipitation of the phosphates of lime and magnesia, and giving other indications of its presence, by restoring the blue colour to litmus-paper.

When supersaturated carbonate of soda was taken, the precipitation of the phosphates was less distinct and less rapid, as they remained dissolved for some time by excess of carbonic acid in the urine, and then began to appear as a pellicle at the surface by gradual escape of the carbonic acid in the form of gas.

In experiments with potash, the results were the same as when soda was employed.

Magnesia had also the same effect of occasioning a precipitation of the earthy phosphates; but on account of its insolubility, a greater length of time was required to produce the effect.

Lime-water also required as much as five hours to produce a sensible precipitation; and even then it was not nearly so distinct as from the alkalies.

Since the effects of soda or potash were altered by the presence of carbonic acid, the acid itself was tried alone, by taking twelve ounces of water highly impregnated with carbonic acid; and as it evidently passed off by the kidneys, and appeared in the urine of a healthy

person, it was afterwards tried in one who was subject to calculus, consisting of the triple phosphate of magnesia. Though his stomach did not admit the use of stronger acids, the carbonic acid proved highly grateful; and by examination of his urine, it appeared that the phosphates, which before were voided as a sediment of white sand, were now passed only in a state of complete solution, by means of the redundant acid.

Supplement to the First and Second Part of the Paper of Experiments for Investigating the Cause of Coloured Concentric Rings between Object-glasses, and other Appearances of a similar Nature. By William Herschel, *LL.D. F.R.S.* Read March 15, 1810. [*Phil. Trans.* 1810, *p.* 149.]

The Supplement now offered to the Society, is intended to clear up certain points which have been represented to the author as obscure or doubtful in his former communications, and at the same time to connect more intimately the prismatic experiments of the second paper with those made upon convex glasses, and described in the author's first paper on the subject.

Since Dr. Herschel has heard the originality of his observation of the red bow called in question, upon the ground that a red bow had been observed by Sir Isaac Newton, which is merely the converse of the blue bow (the change of colour being dependent upon the direction in which the light is received upon the prism), Dr. Herschel first endeavours to answer the objection, and reminds us that in his former observations the angular breadth and elevation of the two bows are different; but those of the Newtonian blue and red bows are said to be, and are, necessarily equal. In the Newtonian experiment also, the same beam of light is made to exhibit both phenomena, being received upon two right-angled prisms, applied base to base, so that one portion of the light is reflected upwards, as a blue bow from the under surface of the first prism; and the remainder, by transmission, through the second prism, appears as a red bow to an eye beneath. But in Dr. Herschel's experiment, the same prism is made to exhibit, to an eye in the same situation, the red bow as well as the blue, by means of light transmitted in an opposite direction through the under surface of the prism, without any occasion for a second prism, which (as Dr. Herschel observes) is necessary in the Newtonian method of conducting the experiment.

The next objection replied to by Dr. Herschel, regards the streaks that may be seen adjacent to the bows when a second surface is applied to that side of a prism at which a critical separation of the colours takes place. It has been said that streaks parallel to the bows, though not dependent on critical separation, will in that situation be seen most easily and most distinctly, because the visual ray, under those circumstances, passes with the greatest obliquity between the surfaces.

To this objection Dr. Herschel replies, that these streaks not only